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ABSTRACT

The purpose of this study was to extend a relationship between teacher verbal rewarding and punishing behavior and subject matter growth previously obtained with middle-class postprimary children, with a different population; namely, first-grade, lower-class children. The subjects were 366 children and 20 teachers from first-grade classes participating in Project Follow-Through in the Eastern United States. The total sample consisted of those 190 Negro and 176 Caucasian children for whom complete test batteries were available. During the school year, teacher-pupil verbal interaction in the selected classrooms was observed and recorded. Measures of verbal reward, verbal punishment, and a control ratio were derived from observations by trained observers for each teacher. The test battery, administered in the fall and spring of the school year, consisted of samples of items drawn from the Metropolitan Readiness Test, Early Childhood Inventory Project Test, and Educational Testing Service Examination. The principal finding was that Negro children gained more on the Word Meaning subtest when they were in integrated classrooms. However, of interest was the inability of this research to substantiate a relationship between teacher verbal behaviors and subject-matter growth of students. (Authors/JM)

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THE EFFECTS OF VERBAL REWARD AND PUNISHMENT ON SUBJECT-MATTER GROWTH OF CULTURALLY DISADVANTAGED FIRST GRADE CHILDREN[1]

by

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The education of so-called "disadvantaged" children is of utmost concern and interest to educators. Many educators acknowledge that American schools have failed the children of the poor. Consequently, much time and effort has been concentrated on the questions of why have schools failed the disadvantaged, how are these children "different," and in what way can they best be taught.

In 1956, Rosen examined parents and children of lower- and middle-class backgrounds and found more emphasis on early independence with the latter group. Hawkes and Koff (1969) reported significant differences on anxiety measures by socio-economic status with differences of greatest magnitude observed for lower-class children. The relationship between anxiety and dependency was demonstrated by Rosenthal (1966) in a study in which he reported that dependent behavior increased as anxiety increased.

The dependency needs of disadvantaged children and their educational significance were identified and discussed by Marans and Lourie in Volume 1 of Disadvantaged Child published in 1967. Under experimental conditions, Bernardin and Jessor (1957) found significantly lower performance for dependent subjects under conditions of negative verbal reinforcement and concluded that dependent students need significantly more approval and help to succeed.

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[1]This paper is based on a dissertation submitted by the first author to the Graduate Council of the University of Florida in partial fulfillment of the requirements for the Degree of Doctor of Education.

Further, Flanders, Anderson, and Amidon (1961) reported that dependent-prone students are more sensitive to the behavior of the teacher than those who are non-dependent-prone. They concluded that dependent-prone students will probably learn more subject matter when their greater need for supervision and personal support is satisfied.

Many studies have examined the relationship between both teacher-presented verbal rewards and punishers and subject-matter growth of students (See Flanders, 1970, for a comprehensive review). The generalizability of findings resulting from these studies was limited since they were conducted on post-primary, middle-class children.

The purpose of this study was to extend the present, suspected relationship between teacher verbal rewarding and punishing behavior and subject-matter growth with a different population; namely, first-grade, lower-class children. To this end, the following null hypotheses were tested: (1) There is no significant difference in achievement gain under varying conditions of teacher presented verbal reward and punishment as a function of sex and heterogeneous/homogeneous grouping of students by race, and (2) There is no significant polynomial function that describes the relationship between teacher-presented verbal reward (indirect control) or punishment (direct control) and growth in subject matter by students.

METHODS

Data Sources

Subjects. The subjects for this study were 366 children and 20 teachers from first-grade classes participating in Project Follow-Through in the Eastern United States. The total sample of 366 children consisted of those 190 Negro children and 176 Caucasian children for whom complete test batteries were available.

Instrumentation. During the school year, teacher-pupil verbal interaction in the selected classrooms was observed and recorded using the Reciprocal Category System (Ober, 1967), an outgrowth and extension of Flanders' Interaction Analysis (Flanders, 1960). Measures of verbal reward (indirect control), verbal punishment (direct control), and a control ratio (revised ID Ratio) were derived from observations by trained observers for each teacher.[2]

Original plans for determination of subject-matter growth called for utilization of a complete battery of 13 subtests. These tests were administered by Stanford Research Institute in its role of external evaluator as required by legislation establishing Project Follow-Through. The battery consisted of three booklets, administered in the fall and spring of the school year, which were samples of items drawn from three nationally standardized tests: The Metropolitan Readiness Test; Early Childhood Inventory Project Test (Institute for Developmental Studies, New York University, Martin Deutsch); and Educational Testing Service Examination (Caldwell and Soule). Subtest booklets which were administered to the subjects were composed of randomly selected items from the complete subtests of the above standardized tests. There is no evidence available as to the validity and reliability of these subtest booklets. On the premise that the items were randomly selected and assigned to the students, it is speculated that these sample measures are comparable to the complete subtests. However, there are no data available to substantiate or refute this speculation.

Examination of pretest scores necessitated that two adjustments be made in the data analysis:

1) It was not feasible to utilize the complete battery of tests because

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[2]Data gathering was sponsored by Office of Education Grant, OEG-0-8-522471-4618(100).

more than 50 percent of the subjects attained a maximum score on 9 of the 13 subtests. Since these 9 subtests could not measure any pupil gains, they were dropped from the study. The 4 remaining subtests were from the Metropolitan Readiness Tests. Of these 4, Subtests 1 (Word Meaning) and 5 (Numbers) were selected as measures of pupil growth reflecting verbal or abstract and quantitative or concrete learnings.

2) Analysis of pre-test results yielded 11 statistically significant differences in mean pre-test scores with the scores for Negro subjects being lower than those of the Caucasian subjects. (See Table 1 below)

TABLE 1

SIGNIFICANCE OF DIFFERENCES BETWEEN
ETHNIC GROUPS STUDIED ON PRETEST MEASURES

Test	Negro		Caucasian		
	$\bar{x}$	s	$\bar{x}$	s	t value
Metropolitan Readiness Test					
Subtest #1	2.18	1.08	3.05	1.33	6.987[a]
2	3.78	1.13	4.02	1.10	1.978[b]
3	2.77	1.52	3.41	1.30	4.363[a]
4	4.06	1.84	4.26	1.85	1.034
5	3.37	1.88	4.37	2.09	4.852[a]
6	1.96	1.28	2.22	1.49	1.798[c]
Early Childhood Inventory					
Subtest #1	7.47	2.00	7.77	1.92	1.455
2	4.40	1.63	5.30	1.26	5.916[a]
3	2.13	0.93	2.40	0.63	3.337[a]
Caldwell-Soule					
Subtest #1	5.03	1.06	5.36	0.88	3.290[a]
2	2.64	1.14	3.20	0.87	5.321[a]
3	5.67	1.47	6.68	1.36	6.821[a]
4	5.34	0.94	5.65	0.66	3.608[a]

[a] $p < .005$ [b] $p < .025$ [c] $p < .05$

Since this study was concerned with pupil growth, gain scores were calculated for all subjects. While racial differences were found to be

operating on pretest measures, these differences were not found with gain scores. When the relation of pretest to gain was studied, however, significant negative relations were found as shown in Table 2.

TABLE 2

CORRELATIONS BETWEEN PRETEST AND
RAW GAIN SCORES

Test or Subtest	r*	
	Negro	Caucasian
Metropolitan Readiness		
1. Word Meaning	-.45	-.50
2. Listening	-.57	-.61
3. Matching	-.66	-.65
4. Alphabet	-.82	-.89
5. Numbers	-.51	-.62
6. Copying	-.38	-.52
Early Childhood Inventory		
1. Alphabet	-.90	-.89
2. Numerals	-.83	-.83
3. Shape Names	-.56	-.52
Caldwell-Soule (E.T.S.)		
1. Social Responsiveness	-.66	-.72
2. Associate Vocabulary	-.50	-.61
3. Concept Activation Numerical	-.51	-.67
4. Concept Activation Sensory	-.74	-.56

*All correlations were significant at $p < .005$

Because there was no random assignment of children to teacher or matching of children in the various classrooms, a statistical procedure was deemed necessary to equate the classrooms.

On the basis of the high, negative correlations between pre-test and raw gain scores, the gain scores were adjusted according to a procedure suggested by Webster (1958, 1959) to correct for pre-test score differences. This process should statistically equate the classrooms. It was determined that adjusted gain scores should be calculated separately for the two racial groups in light of the finding of statistically significant mean pre-test scores. Otherwise, the statistical technique employed would have the effect

of decreasing the gain scores for the Negro children and increasing the gain scores for the Caucasian children. All further analyses were conducted keeping the subjects separate by race.

Tests were conducted to determine equality of coefficients obtained from the regression of pre-test on gain between the Negro and Caucasian groups. These tests revealed one significantly different regression coefficient which could be expected by chance with 13 t-tests. In summary, no statistically significant differences were found between the two racial groups in the regression coefficients of pre-test on gain scores. These figures are presented in Table 3.

TABLE 3

t-TESTS FOR THE REGRESSION COEFFICIENTS
OF PRETEST ON RAW GAIN SCORES

Test or Subtest	Negro	Caucasian	t
Metropolitan Readiness			
1. Word Meaning	-.54	-.45	.937
2. Listening	-.69	-.74	.427
3. Matching	-.63	-.63	.115
4. Alphabet	-.73	-.83	3.067*
5. Numbers	-.45	-.53	1.058
6. Copying	-.44	-.47	.334
Early Childhood Inventory			
1. Alphabet	-.81	-.84	.737
2. Numerals	-.73	-.73	.073
3. Shape Names	-.49	-.54	.656
Caldwell-Soule (E.T.S.)			
1. Social Responsiveness	-.70	-.76	.672
2. Associate Vocabulary	-.53	-.68	1.489
3. Concept Activation Numerical	-.53	-.54	.060
4. Concept Activation Sensory	-.77	-.68	1.070

*$p < .01$

ANALYSIS AND RESULTS

Twelve univariate analyses of variance were conducted to test Hypothesis 1. A 2x2x2 factorial design was employed; with the three factors

of (a) sex of students (b) high vs. low levels of reward, punishment, or control ratio, and (c) grouping of students (heterogeneous vs. homogeneous by race) being common to all analyses. Adjusted gain scores on sample Subtests 1 and 5 of the Metropolitan Readiness Tests served as the dependent variables.

The factor of grouping was significant ($p < .001$) for the Negro children when Subtest 1, Word Meaning, was the dependent variable regardless of the levels of reward, punishment or control ratio. These three analyses of variance are presented in Tables 4 through 6.

TABLE 4

ANALYSIS OF VARIANCE FOR
ADJUSTED GAIN SCORES OF NEGRO SUBJECTS ON
SUBTEST 1 AS A FUNCTION OF VERBAL REWARD

Source	df	MS	F
A Reward	1	0.292	0.232
B Sex	1	0.028	0.022
C Grouping	1	15.465	12.305*
A x B	1	1.797	1.430
A x C	1	0.560	0.446
B x C	1	3.133	2.493
A x B x C	1	1.822	1.450
Error	180	1.257	

*$p < .001$

TABLE 5

ANALYSIS OF VARIANCE FOR
ADJUSTED GAIN SCORES OF NEGRO SUBJECTS ON
SUBTEST 1 AS A FUNCTION OF VERBAL PUNISHMENT

Source	df	MS	F
A Punishment	1	0.012	0.009
B Sex	1	0.156	0.123
C Grouping	1	16.010	12.636*
A x B	1	0.001	0.000
A x C	1	0.060	0.048
B x C	1	1.663	1.313
A x B x C	1	0.360	0.284
Error	180	1.267	

*$p < .001$

TABLE 6

ANALYSIS OF VARIANCE FOR
ADJUSTED GAIN SCORES OF NEGRO SUBJECTS ON
SUBTEST 1 AS A FUNCTION OF VERBAL CONTROL RATIO

Source	df	MS	F
A Control Ratio	1	0.001	0.001
B Sex	1	0.197	0.155
C Grouping	1	16.209	12.774*
A x B	1	0.039	0.031
A x C	1	0.101	0.080
B x C	1	1.795	1.414
A x B x C	1	0.183	0.144
Error	180	1.269	

*$p < .001$

Inspection of mean adjusted gain scores revealed that the Negro children in heterogeneous classrooms demonstrated more gain than those in homogeneous classrooms.

Analyses of variance for the Caucasian subjects yielded significant F ratios ($p < .05, < .005, < .005$) for the main effect of sex across the three separate analyses of the adjusted gain scores for Subtest 1, with males demonstrating more gain than females. Results of these analyses of variance are presented in Tables 7 through 9.

TABLE 7

ANALYSIS OF VARIANCE FOR
ADJUSTED GAIN SCORES OF CAUCASIAN SUBJECTS ON
SUBTEST 1 AS A FUNCTION OF VERBAL REWARD

Source	df	MS	F
A Punishment	1	0.003	0.002
B Sex	1	5.122	4.865*
C Grouping	1	0.038	0.036
A x B	1	0.007	0.006
A x C	1	0.169	0.161
B x C	1	0.724	0.688
A x B x C	1	0.378	0.359
Error	165	1.053	

*$p < .05$

TABLE 8

ANALYSIS OF VARIANCE FOR
ADJUSTED GAIN SCORES OF CAUCASIAN SUBJECTS ON
SUBTEST 1 AS A FUNCTION OF THE VERBAL PUNISHMENT

Source	df	MS	F
A Punishment	1	0.627	0.601
B Sex	1	11.271	10.801*
C Grouping	1	0.062	0.059
A x B	1	0.042	0.040
A x C	1	0.388	0.372
B x C	1	1.222	1.172
A x B x C	1	1.398	1.340
Error	165	1.043	

*$p < .005$

TABLE 9

ANALYSIS OF VARIANCE FOR
ADJUSTED GAIN SCORES OF CAUCASIAN SUBJECTS ON
SUBTEST 1 AS A FUNCTION OF VERBAL CONTROL RATIO

Source	df	MS	F
A Control Ratio	1	0.002	0.002
B Sex	1	8.792	8.585*
C Grouping	1	0.015	0.015
A x B	1	3.720	3.632
A x C	1	0.297	0.290
B x C	1	0.320	0.312
A x B x C	1	0.439	0.428
Error	165	1.024	

*$p < .005$

No significant effects were found for either group of subjects when the criterion variable was Subtest 5, Numbers. In the interest of brevity, no analysis of variance tables are included for these non-significant analyses.

As the main effect of teacher verbal behavior was not found to be significant, regardless of the other factors identified, Hypothesis 1 was not rejected.

In order to test Hypothesis 2, the existence of a non-linear relationship between the teachers' behavior and the subject-matter growth of the

children, twelve separate polynomial regression analyses were conducted; six, each, for the Negro and Caucasian groups. These six tests included one for each of the three independent variables of teacher-presented verbal control regressed against the two dependent variables of adjusted gain scores for Subtests 1 and 5. Analyses were carried out for each of the 12 data sets using the first- through the fourth-degree polynomial functions with the resultant finding of no significant relationships. As indicated by these results, Hypothesis 2 was not rejected.

EDUCATIONAL SIGNIFICANCE OF THE STUDY

The principal finding of this study was that Negro children gained more on Subtest 1, Word Meaning, when they were in integrated classrooms; however, of interest was the inability of this research to substantiate a relationship between teacher verbal behaviors and subject-matter growth of students.

The failure to replicate previously reported findings of studies conducted with older, middle-class children should be seriously considered by educators concerned with teaching disadvantaged children. The sample is neither large nor random; but if they replicate, the findings of this study would lend support to Goldberg's (1967) position that verbal rewards such as "that's good" may be too intangible to act as reinforcers for many disadvantaged children. As pointed out by Bereiter and Engleman (1966), the lower-class child "...is not strongly motivated to work for praise..." (p. 85). It would seem that the children from the subculture of the poor may not need simply more of what works with the middle-class child, but a different educational approach. As the two subcultures differ, so do the children; consequently, educational programs may need to be as diverse as the populations they serve.

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